

What is claimed is:

- B
1. A ^{method}~~process~~ for improving the nutritional value of a phytate-containing foodstuff comprising:
- B
- contacting said phytate-containing foodstuff with a substantially pure phytase enzyme having an amino acid sequence ~~selected from the group consisting of~~ SEQ ID NO:2, such that said substantially pure phytase enzyme catalyzes the liberation of inorganic phosphate from the phytate in said phytate-containing foodstuff.
- B
2. The ^{method}~~process~~ according to claim 1 wherein said substantially pure phytase enzyme is produced by a recombinant expression system comprising a first phytase-encoding nucleic acid having a nucleotide sequence selected from the group consisting of:
- a) SEQ ID NO:1, and
 - b) SEQ ID NO:1 wherein T can also be U;
- wherein the expression of the phytase-encoding nucleic acid leads to the production of said substantially pure phytase enzyme.
- B
3. The ^{method}~~process~~ according to claim 1 wherein the liberation of the inorganic phosphate from the phytate in said phytate-containing foodstuff occurs prior to the ingestion of said phytate-containing foodstuff by a recipient organism.
- B
4. The ^{method}~~process~~ according to claim 1 wherein the liberation of the inorganic phosphate from the phytate in said phytate-containing foodstuff occurs after the ingestion of said phytate-containing foodstuff by a recipient organism.
- B
5. The ^{method}~~process~~ according to claim 1 wherein the liberation of the inorganic phosphate from the phytate in said phytate-containing foodstuff occurs in part prior to and in part after the ingestion of said phytate-containing foodstuff by a recipient organism.

6. A recombinant expression system that is serviceable for use in the process according to claim 2 wherein:
- a) said recombinant expression system is capable, when contained in a host cell, of expressing a first nucleotide sequence encoding a phytase enzyme having the amino acid sequence selected from the group consisting of SEQ ID NO:2, and
 - b) said expression system comprising said nucleotide sequence encoding said enzyme is operably linked to transcription controlling nucleotide sequences operable in said host cell.
7. A transfer vector which comprises the expression system according to claim 3.
8. The expression system of claim 3 wherein the control sequences comprise a constitutive promoter.
9. The expression system of claim 3 wherein the control sequences comprise a tissue-specific promoter.
10. The expression system of claim 3 wherein said host cell is a prokaryotic cell.
11. The expression system of claim 3 wherein said host cell is a eukaryotic cell.
12. The expression system of claim 8 wherein said host cell is a higher plant cell.
13. The expression system of claim 3 wherein said first nucleotide sequence is preceded by a second nucleotide sequence encoding a signal peptide operably linked to said protein.
14. The expression system of claim 10 wherein said signal peptide is the PR protein PR-S signal peptide from tobacco.

15. Prokaryotic cells modified to contain the expression system of claim 7.
16. Eukaryotic cells modified to contain the expression system of claim 8.
17. Higher plant cells or the cells of plant parts or intact plants modified to contain the expression system of claim 9.
18. A method to produce a microbial phytase in a plant cell, plant part or plant according to claim 14, which method comprises:
- a) culturing the plant cell, plant part or plant of claim 14 under conditions wherein said first nucleotide sequence is expressed; and
 - b) converting said plant cells, plant parts or plants into a composition suitable for animal feed.
19. A feed composition for animals which comprises the plant seeds, plant cells, plant parts or plants of claim 14 in admixture with phytate-containing foodstuff.
20. A method to treat a human or an animal able to benefit from digestive enhancement by the activity of an exogenous phytase enzyme, which method comprises orally administering to said human or animal an amount of plant seeds, plant cells, plant parts or plants of a transgenic plant effective to provide the phytase activity in said human's or animal's digestive tract, wherein said plant has been modified to contain an expression system which expresses a nucleotide sequence encoding said phytase enzyme in its seeds, cells, or plant parts.